APPENDIX A

APPENDIX A

PRACTICAL APPLICATION OF THE ICO AND IUSG LICENSING AND RELOCATION PLANS

Although there is widespread support for most of the positions expressed by the IUSG in its comments in this proceeding, as described in the foregoing Reply Comments, the Commission (as well as incumbent licensees and potential MSS licensees) may desire a demonstration that the ICO and IUSG Licensing and Relocation Plans can work in practice. In the following pages, the IUSG explains how the licensing proposal recommended by ICO and the IUSG to the International Bureau[1] coincides with the IUSG/ICO Relocation Plan to provide a workable mechanism by which 2 GHz MSS can commence operations in the near term without wholesale, premature, costly and disruptive relocation of incumbent BAS and FS licensees. The IUSG also explains how these proposals will provide the kind of relocation reimbursement generally deemed desirable by 2 GHz incumbents without prejudicing future 2 GHz MSS entrants.

I. THE ICO/IUSG LICENSE PLAN IS PREMISED ON SEVERAL FUNDAMENTAL PRINCIPLES THAT SERVE THE PUBLIC INTEREST.

In order for the IUSG/ICO Relocation Plan to work in practice, the Commission must establish a licensing scheme that recognizes certain fundamental principles:

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[1] See letter from Cheryl Tritt, Counsel to ICO Global Communications, to Magalie Roman Salas, Secretary, FCC (February 1, 1999), filed *Ex Parte*, File No. 188-SAT-LOI-97, ET Docket No. 95-18, RM-9328 (hereinafter "ICO/IUSG License Plan"). The ICO/IUSG License Plan is, in fact, similar to one option already being considered by the International Bureau (see IUSG Reply Comments at Section III.A.5.).

- it must permit expeditious entry into the MSS marketplace by new entrant 2 GHz operators in a manner that accommodates, rather than delays, the early commencement of service to the public;
- it must promote efficient use of the spectrum by authorizing only those applicants that demonstrate that they are commercially and technically viable;
- it must ensure access to the allocated 2 GHz spectrum by later entering MSS operators; and
- it should allow maximum flexibility in spectrum assignments to individual MSS licensees.

Each of these licensing principles would serve the public interest by engendering new 2 GHz MSS operations that will provide the public with additional competitive telecommunications services while making optimal use of the valuable spectrum resource. And none are new to the Commission's licensing processes.

A. Expeditious Entry.

There are nine applications pending before the Commission for authority to provide 2 GHz MSS. These applications are at widely disparate stages of development, and most are not expected to commence operations until the year 2003 at the earliest. One, however, is prepared to initiate service in the near term. The ability of ICO to begin service to the American public in the next 18 months — through its prospective service partner, the IUSG — should not be frustrated because other applicants will not be prepared to do so for several years. No party to

this or any other proceeding has offered any valid public interest justification for delaying the advent of a valuable, competitive telecommunications service so that applicants that need additional time to obtain financing, begin construction of their systems, and launch their satellite constellations (if, in fact, they are able) can commence service simultaneously with those that are almost ready to do so. The rapid introduction of new technologies and services is a hallmark of Commission regulation, and there is every reason for the Commission to adhere to that objective in this proceeding.[2]

B. Efficient Spectrum Use and the Avoidance of Warehousing Require that Only Qualified, Eligible Applicants be Licensed.

Pursuant to the Communications Act,[3] the Commission has for some time followed a policy that is intended to ensure that only those satellite applicants that are likely to utilize the spectrum are licensed. The Commission has also consistently condemned spectrum warehousing in some 15 years of satellite proceedings. In accordance with these policies, the Commission customarily adopts a host of legal, technical and financial requirements for each new satellite service.[4] The rationale underlying the Commission's policies is that the spectrum resource is too valuable, and the needs of the public for new services are too pressing, for the Commission to authorize "paper" systems whose theoretical spectrum requirements will force truly viable systems to accept inadequate or inappropriate spectrum assignments. Given the strong public interest in

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2 See 47 U.S.C. § 157 (a), (b).

3 See 47 U.S.C. § 308 (b).

4 See, e.g., 47 C.F.R. § 25.143 (licensing provisions for the 1.6/2.4 GHz MSS).

the near-term establishment of vigorous competition in the U.S. MSS, the IUSG urges the Commission to apply its anti-warehousing policies to 2 GHz MSS by licensing only those applicants that meet basic eligibility criteria. In addition, and to provide further assurance that warehousing will not occur, it is imperative that the Commission not grant automatic access to predesignated spectrum even for those applicants initially determined to be eligible for licensing. Access should not be granted until it is clear that such systems are "real" and will, in fact, materialize, as *a priori* spectrum designations will only serve to hinder the ability of other, viable applicants to obtain financing, and of operational systems to provide service in the least costly and most spectrum-efficient manner.

C. Later MSS Entrants Must be Assured Spectrum Access.

It might be argued that permitting early entry by one or more 2 GHz MSS systems would disserve the public interest if it should somehow inhibit the later entry of additional MSS competitors. Although the IUSG does not believe that this result will apply, it recommends that the Commission take steps to assure spectrum access for later entering MSS operators so as to assuage any concerns of parties taking a contrary view.[5] Such assurance will free later entering systems from the need to begin the process of relocating 2 GHz incumbent licenses now, years before they are prepared to initiate service and, in many cases, years before they even have the financial wherewithal to make relocation commitments. Terrestrial incumbents will benefit as well, as they will be spared premature and/or unnecessary relocation.

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[5] Measures to assure spectrum access should be developed in the context of the Commission's 2 GHz Licensing NPRM comment process.

D. Maximum Flexibility in Spectrum Assignments.

As the Commission is well aware, satellite operators often need to change the basic parameters of their satellite systems numerous times between the time they file their initial applications and the time they inaugurate service.[6] Indeed, many applicants file alternative technical plans because of the uncertainties of the market and the constantly changing state of technology.[7] These same uncertainties, which include uncertainty as to the availability of capital, make it impossible for the Commission to predict with any degree of confidence at the time it makes licensing decisions which satellite applicants will ever provide commercial service. Indeed, it should not be the Commission's task to make such predictions; the "market" will determine which applicants succeed and which do not. The Commission's task is to facilitate the availability of new service, not mandate who will provide it. Accordingly, it would be unwise — as well as wholly impractical — for the Commission, at this early stage, to determine which applicant gets how much spectrum and which particular spectrum an applicant is to use. The far better approach — and, in fact, the only one which will ultimately serve the public interest in new, low-cost

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6 By way of example, the initial Teledesic Ka-band system application proposed a constellation of 840 satellites in 21 orbital planes, but the system was recently modified to include only 288 satellites in twelve orbital planes. See Order & Authorization, File No. 195-SAT-ML-97, released January 29, 1999 (DA 99-267).

7 See, for example, the 2 GHz applications of Globalstar (FCC File Nos. 182-SAT-P/LA-97(64) and 183 through 186-SAT-P/LA-97) (proposing CDMA, TDMA and FDMA), Iridium (FCC File No. 187-SAT-P/LA-97(96)) (proposing CDMA and TDMA) and TMI (FCC File No. 189-SAT-LOI-97) (proposing CDMA and FDMA) as proposed systems that do not appear to be final plans.

service — is to provide for maximum spectrum availability to all MSS licensees while ensuring that each eligible and qualified licensee is permitted access to spectrum when it needs it.

E. Implementation of the ICO/IUSG License Plan Entails Few Fundamental Elements.

Implementing the licensing principles outlined above need not be complicated and will, in fact, reduce the Commission's involvement in band planning and relieve it of the undoubtedly unwanted task of determining which systems are real and which are not, which should get spectrum (and which spectrum they should get) and which should not. The ICO/IUSG License Plan is, in fact, very similar to the International Bureau's "Option 3" as presented to the 2 GHz MSS applicants at an information meeting held at the FCC on January 7, 1999. Moreover, the ICO/IUSG License Plan ***is the only licensing proposal which is specifically intended to take into account the 2 GHz relocation process*** -- a process which could easily derail other licensing schemes that are premised on *a priori* spectrum assignments to system applicants that are years from providing service or are far from having the financial capability to clear the 2 GHz band. [8]

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[8] Many BAS and FS licensees have demanded that the 2 GHz band be cleared in advance of the provision of any new 2 GHz MSS service. MSTV/NAB, for example, calls for a near-term nationwide cutover, requests that all MSS applicants post a performance bond to cover all future relocation costs, and urges that all MSS applicants be forced to the negotiation table now. MSTV/NAB Comments at 12, 15-17 & n. 24. The APTS and SBE insist that MSS pay for relocation "in advance." APTS Comments at 7; SBE Comments at 3,4. Iridium, on the other hand, urges in its comments in this proceeding that all BAS and FS incumbents depart the 2 GHz band by a date certain, and asks that the deadline for that departure be set no later than three years from the date on which the Commission grants 2 GHz licenses to MSS operators. Iridium Comments at 2,3. Notwithstanding these somewhat conflicting suggestions, and wholly apart from

(continued...)

Importantly, the ICO/IUSG License Plan does not require the Commission to pick and choose which applicants get particular spectrum assignments. Under the plan, the Commission need not select the amount of spectrum for a particular licensee or the precise location of that spectrum in the band. Were the Commission to make such selections, it might, by blind luck, create an efficient allocation of spectrum and other resources, but would in greatest probability produce instead an inefficient allocation that would result in the great inconvenience and cost to BAS and FS incumbents and new MSS entrants, not to mention the public. By instead allowing each MSS licensee, as it nears the provision of service, to select which spectrum it wishes to coordinate, and to decide for itself what spectrum it needs to clear and how to clear it, the Commission will provide the greatest possible economic utility to incumbents and MSS licensees alike. No other licensing plan yields this result.

The essential elements of the ICO/IUSG 2 GHz MSS License Plan are as follows:

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[8](...continued)

the question of whether sharing between MSS licensees and 2 GHz incumbent operations is likely, they would, in practical effect, require all MSS licensees to set aside what could be millions of dollars in relocation funds years before most are prepared to offer service and perhaps years before many MSS licensees have the necessary financing even to begin construction of their respective systems. It is highly improbable that the Commission will be able to get the operators of currently unfinanced systems, whose plans call for initiation of service five or six years from now, to negotiate and pay in the next 18-36 months for relocations they do not presently need or, because of a failure to construct, may never require.

- Using existing Big LEO rules as a starting point,[9] the Commission should establish basic eligibility standards by which to determine whether or not to conditionally license particular applicants.[10]
- 2 GHz NGSO MSS systems should be conditionally licensed across the entire 1990-2025 and 2165-2200 MHz bands (and, given the Region 2 allocations, it is suggested that 2 GHz GSO MSS systems be conditionally licensed within appropriate portions of the allocated Region 2 spectrum).
- Both NGSO and GSO systems should be required to have sufficient frequency agility to operate in any part of the band, as spectrum assignments may be changed over time. As new systems enter the market, overall spectrum usage will increase and additional spectrum will need to be cleared.
- Rather than concocting an *a priori* band plan, the Commission should provide for domestic intersystem coordination among MSS licensees to determine authorized operational frequency segments for each eligible, licensed system.

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9 See 47 C.F.R. §§ 25.114, 25.140, 25.143.

10 In order to prevent spectrum warehousing, license conditions should include, for example, regular demonstrations of progress towards commercial operation involving satisfaction of identifiable developmental milestones similar to those used for the Big LEO service. Unlike the milestones employed for the Big LEO Service, however, the time periods associated with 2 GHz MSS developmental milestones should begin to run upon an operator's receipt of a conditional license to operate its user links. Given the number of 2 GHz applicants and the relocation obligation, developmental milestones should not be tied to an operator's receipt of a license to operate either its cross-links or its feeder links.

- Early entrants' licenses should be conditioned to avoid claims of priority in coordination with subsequently entering systems (in other words, this would not be an ITU type "Coordination").
- Eligibility to participate in intersystem coordination would be granted upon the achievement of a measurable developmental milestone by the newly entering system that is far enough along in the construction process to assure the establishment of a meaningful system, but early enough in the system's operational plan to allow adequate time for such intersystem coordination, relocation (if still necessary) and system implementation. In this regard, the IUSG suggests that to be eligible to participate in domestic intersystem coordination, a 2 GHz MSS operator must first, in addition to filing a request for ITU frequency coordination and meeting other FCC developmental milestones (See n. 8, supra), demonstrate that it has entered into an unconditional launch contract and is within one year of the launch of its first satellite.

- 2 GHz MSS conditional licensees that satisfy the foregoing developmental and intersystem coordination milestones should be granted permanent licenses and be assured of receiving a minimum amount of spectrum as a result of the coordination process.

- In order to ensure that domestic intersystem coordination is conducted in good faith and that later entrants are, in fact, granted a minimum spectrum block upon achievement of the designated milestones, FCC oversight should be available to resolve any disputes.

The IUSG believes that the foregoing six elemental steps are all that is necessary for the Commission's 2 GHz licensing process to meet the basic public interest driven principles set forth at the beginning of this Appendix.[11]

II. THE RELOCATION PROCESS RECOMMENDED BY THE IUSG WILL FACILITATE THE INAUGURATION OF SERVICE BY NEW 2 GHz MSS SYSTEMS AND MINIMIZE DISRUPTION TO INCUMBENTS AND COSTS TO ALL.

Just as in the case of the licensing of new 2 GHz satellite systems, the regulatory process by which the Commission will implement its ET/Microwave relocation policies (as appropriately modified for 2 GHz MSS) must also meet certain essential public interest objectives. These can

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[11] The IUSG respectfully submits that, in contrast, The International Bureau's Options 1 and 2 are deficient in a number of key respects: (i) they are inefficient and wasteful, in that they either under- or over-assign spectrum; (ii) they will be incapable of reflecting the final configuration of any MSS system; (iii) they will cause premature dislocation and/or relocation of incumbents; (iv) they will require premature and, in many cases, unnecessary, relocation expenditures by MSS licensees; (v) they will force MSS systems into premature intersystem coordination, which will likely require the operators of as-yet-unbuilt satellite systems to design those systems to conform to an FCC band plan, rather than to market demand; (vi) they will require band plan and system modifications as licensees modify their designs; (vii) they fail to link licensing and coordination to due diligence milestones; and (viii) they do not effectively encourage competition because the small amount of spectrum licensed to each system will discourage financial investment.

be fairly summarized as follows: (1) facilitating the early introduction of new MSS by avoiding policies which needlessly encumber the relocation negotiation process[12]; (2) minimizing disruption to incumbent BAS/FS licensees by adopting policies which allow for a gradual transition to other equipment and other frequencies[13]; and (3) compensating incumbents that are subject to harmful interference from new MSS systems for required equipment modifications or replacements while, at the same time, minimizing costs to the relocator.[14]

The IUSG/ICO Relocation Plan meets all of these public interest objectives, as demonstrated in the following scenarios. In considering the examples below, however, it is important to remember that they do not reflect the "market-by-market" relocation which several commenters found unworkable (although the IUSG is not convinced that a market-by-market

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12 2 GHz MSS relocation policies that require or allow MSS systems that are years from commencing service to participate in the relocation negotiations of MSS systems that satisfy the developmental milestones described in Section I of this Appendix only serve to provide such later entrants with the ability and incentive to delay the early entrants (either because they are not prepared to pay relocation at this time or otherwise would like to inhibit a competitive service until they themselves are ready).

13 As shown in Section II of the IUSG Reply Comments, the majority of comments filed by incumbent licensees in this proceeding reveal two overriding concerns: (1) incumbents need to receive compensation prior to being required to relocate; and (2) because a simultaneous, nationwide relocation would be a difficult, costly and time-consuming process, it is to be avoided if possible and adequate time for transition must be provided.

14 As also discussed in Section II of the IUSG Reply Comments, many of the MSS commenters pointed out that the imposition of the full costs of a nationwide, simultaneous conversion of BAS incumbents on MSS operators would likely make near-term entry into the U.S. market impossible.

relocation is impossible). Rather, they are premised on a nationwide "channel-by-channel" relocation that the IUSG believes has none of the pitfalls ascribed by commenters to a market-by-market changeover, and none of the problems that would be created by the nationwide simultaneous changeover plan that almost all MSS commenters and many incumbents likewise condemned.[15] Following are three examples that serve to illustrate how the IUSG/ICO License and Relocation Plans would work in practical application.

A. Two NGSO Systems - Channel Assignment Relocation (TDMA/TDMA)

In the first example, there are two NGSO MSS systems — A & B. Both propose TDMA access technology. System A will be operational in the third quarter of the year 2000; System B will be operational in the fourth quarter of 2003. Pursuant to the ICO/IUSG License Plan, the FCC staff has determined that both Systems A & B meet the basic eligibility requirements adopted in the 2 GHz MSS services rulemaking Report & Order (which is anticipated to be concluded by the end of 1999) and are, by the first quarter of 2000, conditionally licensed to operate across the entire uplink and downlink bands. Both licenses are conditioned on a requirement that the licensees coordinate spectrum access with each other and with later entering MSS systems in good faith.

Because both systems are start-up enterprises, spectrum requirements in the early years of system operation (for example, years 1-3) will be minimal (for this purpose, we assume 2 to 6

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[15] Constellation, Boeing and Cosmos, for example, insist (as does the IUSG) that only a phased transition is feasible. Constellation Comments at 4; Cosmos Group Comments at 7-8, 9; Boeing Comments at 5.

MHz). Because System B will not be operational until the end of 2003, however, it does not yet want to negotiate with, and pay for relocation of, incumbents for several reasons: (1) it does not have the funds to do so, or the funds it does have are needed for system development; (2) it has no need for spectrum for four years; and (3) if it waits to enter into relocation negotiations until it is closer to service provision, it may encounter a less costly relocation obligation because some incumbents may have decided for their own competitive reasons to "relocate" on their own. (In the case of BAS, for example, some incumbents may choose to acquire on their own digital equipment capable of operating in the new 85 MHz BAS band plan .)

System A, on the other hand, has only 18 months or so from the present until commencement of commercial service (and would have only six to nine months from the issuance of its conditional license before commercial service would begin); thus, it must start clearing its initially needed spectrum immediately. System A therefore proceeds to clear spectrum in the uplink and downlink bands on its own.[16]

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[16] The IUSG would be seriously concerned if the FCC mandated that System A must negotiate with incumbents *jointly* with System B despite System B's clear economic incentive not to enter into negotiations as yet. System B would have every reason to delay, and none to expedite, the relocation process. Under the ICO/IUSG License Plan, however, System B would acquire no "right" to negotiate for spectrum with System A until System B achieves the developmental and intersystem coordination milestones discussed above. If the Commission should not adopt this aspect of the ICO/IUSG proposal, then it must allow each system to negotiate relocation as each system chooses. Economic reality will determine if System A negotiates relocation individually or jointly with System B.

Knowing that BAS incumbents do not utilize all seven BAS channels in all markets and that analog operation can be conducted in a reduced channel size of 12 MHz,[17] System A determines that its least costly relocation alternative is to reduce BAS Channel 1 to 12 MHz, leaving all other BAS channels (2-7) as currently configured. This decision requires the "displacement" of only a limited number of broadcasters; i.e., only those BAS licensees that are assigned by their local frequency coordinator to operate on Channel 1 on a primary basis. As only those broadcasters in the largest markets have a need for all seven BAS channels,[18] System A is only required to transition an estimated 50-75 television station licensees who have traditionally been assigned operations in Channel 1 (as opposed to the enormous effort and cost that would be required to relocate all 1500 television licensees nationwide from all channels simultaneously).

In order to operate in the cleared portion of BAS Channel 1 (e.g., 2002-2008 MHz),[19] therefore, System A negotiates only with those broadcasters assigned to this channel. At most, System A would be obligated to ensure either that the affected BAS licensees' equipment can be suitably modified to operate in the narrower Channel 1 or, if such is not feasible, to pay for the acquisition of digital equipment capable of doing so. In all cases, as long as the relocated BAS licensee is provided with comparable facilities on a timely basis, it is System A's choice as to whether to modify or replace the incumbent's existing equipment. To the BAS licensee, it should

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17 See, for example, SBE Comments at 2.

18 Id.

19 These frequencies are intended merely to be illustrative; a similar approach could be employed in other frequencies.

make no difference which option System A chooses. The result is the timely provision of comparable facilities to the displaced BAS licensees, but greatly reduced disruption to other incumbents and a minimization of the relocation expense incurred by System A.

System A has thus cleared a portion of BAS Channel 1 on a nationwide basis and begins operation in the cleared subband,[20] having arranged to relocate only a limited number of BAS incumbents (and similarly arranging to relocate only those FS incumbents subject to interference in a limited 6 MHz portion of the downlink band[21]). Between the latter part of the year 2000 and through the third quarter of 2003, System A provides service without conflict with other MSS systems. In late-2003, however, System B is designed to commence operations. One year prior to the launch of System B's first satellite (for illustrative purposes, we assume year end 2001), in accordance with the ICO/IUSG License Plan, System B meets both its developmental and coordination milestones and exercises the right to obtain a defined block of spectrum in the band, coordinate with System A for access if necessary, and assume its relocation obligations, if any.

System B has two choices with regard to relocation. It can either: (1) negotiate to share the 2002-2008 MHz subband (and the corresponding downlink) already cleared by System A and

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20 Because, in many markets, not all seven BAS channels are utilized, clearing a portion of Channel 1 in those areas simply entails requiring frequency coordinators to direct incumbent licensees to operate only in BAS channels 2-7.

21 As the API notes, FS incumbents are not likely to experience harmful interference from MSS systems until there is significant loading of their facilities (API Comments at 10).

reimburse System A for a share of the cleared spectrum to be used by System B; [22] or (2) elect to undertake to clear other 2 GHz spectrum. Presumably, System B will make this choice premised on its system design, anticipated loading in the early years of operation, and estimated costs of relocating new spectrum versus reimbursing System A. A rational and economically efficient outcome, however, can only be achieved if these decisions are made by System B at the time it confronts the question. They certainly cannot be made by the Commission pursuant to some arbitrary band plan three to four years in advance.

System B determines that its most economically efficient option is to use a small amount of the subband cleared by System A and, at the same time, proceed to clear another 2 MHz of spectrum for future growth. System B then notifies System A that it desires to commence intersystem coordination (which System A's license requires it to do in good faith) and that its commercial plan requires 2 MHz of the spectrum already cleared by System A (presumably in both the uplink and downlink bands). Since both systems employ TDMA technology, they cannot operate co-frequency. As a result of the intersystem coordination, however, they agree that System A will retain 4 MHz of the cleared subband and System B will operate in 2 MHz (e.g., from 2006-2008 MHz). System B reimburses System A for one-third of its full relocation costs.

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[22] Under the IUSG/ICO Relocation Plan, System B would be obligated to reimburse System A for its share of the the full costs of System A's earlier clearing of the band (without any "depreciation" discount for the passage of time), including the cost of capital incurred by System A since the time that such funds were first expended (i.e., between 1999 and 2000). If the System A-B coordination resulted in System A retaining 4 MHz and System B utilizing 2 MHz, System B would reimburse System A for one-third of its earlier incurred relocation costs.

At this point, if System A does not require more than 4 MHz to serve its current customers and those expected to be garnered in the near term, it may decide to wait before clearing additional spectrum for growth. On the other hand, if System A determines that it requires a total of 6 MHz for continued operation and growth (or, perhaps more), it can proceed to clear whatever additional spectrum it needs either at its own expense or in conjunction with System B (if the latter determines that it is willing to expend funds in the very early years of its operation for relocating incumbent spectrum that it will not need for another two to three years). In any case, each System will determine the least costly spectrum-clearing alternative given its own particular system design and commercial plan.

If either System A, System B or both require additional spectrum in which to operate, BAS Channel 2 would be the next channel to be partly cleared. Thereafter, BAS licensees would still have five 17 MHz analog channels in which to operate without the need for equipment modification or frequency relocation, and two narrower 10-12 MHz channels (1990-2002 MHz and 2015-2025 MHz).[23] System A and System B would thus be able to operate in a total of 13 MHz (2002-2015 MHz), either individually assuming, or jointly sharing, the costs of the

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[23] See IUSG Comments at Exhibit 1. As before, the cost of clearing a small additional amount of spectrum (in this case, 7 MHz) would only require the modification or replacement of equipment (e.g., either the addition of video filters for analog operation or the acquisition of digital facilities) for a limited number of BAS licensees — i.e., those that have been assigned by the local frequency coordinator to operate in BAS Channel 2 on a primary basis. All other BAS licensees, particularly those not located in the top 50 markets, could continue to operate unfettered in analog BAS Channels 3-7 (which the SBE apparently has found to be adequate for most current needs; see SBE Comments at 2).

relocation of the entire subband based on how much spectrum each agrees to utilize following further intersystem coordination.[24]

B. A CDMA GSO System Enters - Channel Assignment Relocation[25]

By the fourth quarter of 2003, two NGSO TDMA systems may be operating in some or all of the 13 MHz constituting the cleared portions of BAS Channels 1 and 2 (and a corresponding amount of spectrum in the downlink band). BAS licensees which traditionally were assigned by their respective frequency coordinators to operate on these channels either may have had their analog equipment modified to accommodate the narrower channels or may have purchased digital equipment that will accomplish the same result. In either case, only those BAS and FS licensees that were required to be relocated in order to permit 2 GHz MSS operations have in fact been relocated. At this time, a third system — C (a GSO using CDMA technology) — also found eligible by the Commission in the first quarter of 2000 to be granted a conditional license — announces that it has met its developmental and coordination milestones (i.e., it has, in addition to satisfying various construction milestones set forth in the 2 GHz MSS rules, entered into a definitive launch contract and is within one year of the launch of its first satellite). Thus,

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[24] By the 2003-2004 time frame, the clearing of a portion of Channel 2 may not be as costly as was System A's experience in clearing a similar amount of spectrum in Channel 1 three to four years earlier. Some BAS licensees may have already opted to convert their facilities to digital operations for other reasons (competitive, quality, etc.) and thus may be able to operate in the narrower channels without the necessity for forced "relocation."

[25] As it is clear that the first entrant into the 2 GHz MSS market will be ICO — which proposes TDMA technology — no purpose is served by hypothesizing a scenario in which the first entrant is a CDMA system.

the existing two systems — A and B — may have to make room for System C by the end of 2004. (Because System C is a single GSO, it will commence commercial operations at this time as well, i.e., early in 2005.)[26]

By this time, however, ten years will have elapsed since the initiation of the 2 GHz relocation rule making[27] pursuant to which both incumbent BAS and FS licensees were placed on notice of the Commission's spectrum reallocation plans and the need to retune, modify or replace their existing equipment at some future date. If the sunset date recommended by the IUSG and others is adopted, all remaining spectrum in the 1990-2025 MHz and 2165-2200 MHz bands will now become available for MSS use without any additional obligation on the part of MSS operators to fund incumbent relocation. In such a case, assuming Systems A and B are occupying the entirety of the cleared portions of the 2002-2015 MHz subband, System C's obvious choice is simply to notify those remaining incumbent BAS or FS licensees no later than July 2004 (so as to provide them with the six months' notice required by the Commission's ET/Microwave Relocation rules) that they must vacate some or all of the remaining portions of the band (i.e., 1990-2002 MHz and/or 2015-2025 MHz in the case of BAS) so that System C can commence operations. As System C will not, in the early stages of its operation, require 22 MHz of spectrum — and, in addition, as it is a regional GSO — it is unlikely to give notice that all

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[26] Also, because System C operates CDMA, it cannot operate co-frequency with either Systems A or B and must have its own spectrum assignment.

[27] See Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, Notice of Proposed Rule Making, 10 FCC Rcd 3230 (released January 31, 1995).

remaining incumbents must clear the band. Thus, under this scenario, Systems A and B will each continue to share the 13 MHz of previously cleared spectrum and, for illustrative purposes, we will assume that System C gives notice to BAS incumbents that the rest of Channel 2 (which coincides with the Region 2 allocation) must be cleared. In so doing, System C will make available an additional 10 MHz of spectrum for its own operations and growth as well as for the growth of Systems A and B.[28]

If we assume, on the other hand, that the sunset date adopted by the Commission is not until 2006 or 2007, System C then faces the same choices faced earlier by System B: it can enter coordination with either or both Systems A or B to share a portion of the already cleared 2002-2015 MHz subband — and reimburse one or both for a proportional share of their respective relocation costs[29] — or it can clear the small amount of spectrum that it may need for start-up operations on its own. System C will make this choice — as did System B — based upon its then-current system design, its commercial plan and its economic analysis of which alternative best serves its own operational needs.

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[28] On the other hand, if Systems A and B are together utilizing only 10 MHz of the cleared 13 MHz subband, System C may decide that, because it only needs 3 MHz to commence commercial service, it would do better to coordinate with Systems A and B and reimburse them for 23% (3/13) of their earlier incurred relocation expenses. System C might surmise that 3 MHz is enough spectrum to satisfy its commercial plan until the FCC's sunset date (if that date is set later than 2005) arrives.

[29] As before, the amount owed by System C would not include any depreciation factor reflecting the passage of time and would include a factor reflecting the cost of capital incurred by Systems A and B.

If System C determines, for example, that most BAS licensees have already relocated — because, five years after the issuance of the Report & Order in this proceeding, digital operations for ENG are the norm in the broadcast industry and manufacturers are producing such equipment in record quantities and at much-reduced prices — it may opt to arrange for the relocation of those few remaining BAS licensees that continue to operate with analog equipment in the remaining portions of either BAS Channels 1 or 2.[30] Assuming, however, that the Commission prefers that a GSO MSS system with regional commercial plans occupy only that part of the spectrum which is not globally allocated for MSS (i.e., 2010-2025 MHz and 2165-2170 MHz), System C can be expected to opt to clear all of the remaining 10 MHz of BAS Channel 2 at a very much reduced relocation cost. (Indeed, by that date, it may have no meaningful relocation obligation at all.)

Alternatively, System C may choose to utilize a small portion of the bands already cleared by Systems A and B until the remaining incumbents have vacated the band entirely. The choice is essentially an economic one that only System C can rationally make; again, the FCC cannot make the choice at a point in time which is four years before System C knows itself that it will actually launch its satellite and five years before System C knows what incumbent relocation obligations it will face. In any case, by 2005 there are two NGSO TDMA systems and one GSO CDMA system operating in the cleared bands, each having minimized its relocation expenditures by a judicious selection among economic alternatives. In addition, hundreds if not thousands of

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[30] At this point, Phase 3 of the IUSG/ICO Relocation Plan may be needed. See IUSG Comments at 25-26.

incumbent BAS and FS licensees have remained in the band, continuing to utilize their present facilities undisturbed by forced, premature relocation.

C. One TDMA NGSO, Two CDMA NGSO - Channel Assignment Relocation

Following the commencement of operations of System A in 2000, let us assume that two NGSO CDMA systems — also found eligible by the Commission following the adoption of the Report & Order in the 2 GHz MSS services rules proceeding — meet the applicable developmental and intersystem coordination milestones in 2003.[31] By this date, System A may still be operating in the six MHz that it cleared for its own use (i.e., 2002-2008 MHz), and while some BAS incumbents are operating in a narrower Channel 1 of 12 MHz (i.e., 1990-2002 MHz), most are using their existing analog facilities in the undisturbed BAS Channels 2-7.

As new Systems D and E use CDMA technology, they have agreed between themselves to operate co-frequency and to share any relocation costs that they incur equally (on the assumption that both will experience similar loading of their systems). In 2003 they notify System A that they desire intersystem coordination and that each requires 2 MHz of spectrum to commence operations. Because only six MHz of spectrum have been cleared, System A — if all spectrum were divided equally — would find itself with only 3 MHz of spectrum,[32] an amount it determines

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[31] As no 2 GHz MSS applicant (other than ICO) has announced that it is proceeding with system construction in the absence of a Commission license, it is reasonable to assume that the earliest date on which the next 2 GHz MSS system can begin commercial operations is 2004 (a period of four years from the currently anticipated issuance of its conditional license by the FCC).

[32] As noted above, Systems D and E would share their portion of the band and thus (continued...)

to be inadequate to continue serving its existing customers. Assuming Systems D and E have a rational basis for insisting upon occupying 3 MHz of spectrum immediately and that this spectrum must derive from the subband cleared by System A, the latter — coordinating in good faith — can either relinquish its claim to the 3 MHz and begin to clear spectrum elsewhere[33] or offer financial and other inducements to Systems D and E to encourage them to undertake this process themselves. In any case, the resulting decisions will derive from rational, commercial evaluations by the various parties and not from regulatory fiat that has no reasonable chance of yielding an efficient economic outcome.

Assuming for illustrative purposes that System A does relinquish the 3 MHz requested by Systems D and E, System A must, within the following year or so (i.e., before the later entering systems become operational), clear additional spectrum for its own use. At this point, Phase 2 of the IUSG transition plan would become operative (see Section III. B. 1. supra) and the process described earlier would take place.

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As can be clearly seen from the foregoing hypothetical, but realistic, scenarios, the ICO/IUSG License Plan, when coupled with the IUSG/ICO Relocation Plan, provides an

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[32](...continued)
enter the coordination with System A as a single entity.

[33] In such case, of course, Systems D and E would jointly reimburse System A for one-half of its "full" relocation costs (see n. 22, supra.).

economically efficient and spectrum-efficient means of achieving the Commission's public interest objectives. It is also the only proposal presently before the Commission which will do so.